Investigations of Intelligent Solar Heating Systems for Single Family House

Three differently designed intelligent solar heating systems are investigated experimentally in a test facility. The systems provide all the needed yearly heating demand in single family houses. The systems are based on highly stratified tanks with variable auxiliary heated volumes. The tank is a tank in tank heat storage with domestic hot water in the inner tank and space heating water in the outer tank. The total tank volume is 750 liters and the solar collector area is 9 m². The auxiliary energy supply system is based on electrical heating element(s)/heat pump and is different for all three systems. The system will be equipped with an intelligent control system where the control of the electrical heating element(s)/heat pump is based on forecasts of the variable electricity price, the heating demand and the solar energy production. By means of numerical models of the systems made in Trnsys, the control strategy of intelligent solar heating systems is investigated and the yearly auxiliary energy use of the systems and the electricity price for supplying the consumers with domestic hot water and space heating are calculated.

General information
Publication status: Published
Organisations: Department of Civil Engineering, Section for Building Physics and Services
Contributors: Andersen, E., Chen, Z., Fan, J., Furbo, S., Perers, B.
Pages: 1-8
Publication date: 2014
Peer-reviewed: Yes

Publication information
Journal: Energy Procedia
Volume: 48
ISSN (Print): 1876-6102
Ratings:
BFI (2014): BFI-level 1
Scopus rating (2014): CiteScore 1.09 SJR 0.429 SNIP 0.811
Original language: English
Keywords: Stratification, Variable auxiliary heated volume, Solar heating system, Smart control
Electronic versions:
Investigations_of_intelligent_solar_heating.pdf
DOIs:
10.1016/j.egypro.2014.02.002
Source: dtu
Source ID: n:oai:DTIC-ART:elsevier/449476336::38813
Research output: Contribution to journal › Conference article – Annual report year: 2014 › Research › peer-review